Paper No. 28

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SUJEET KUMAR, HARIKLIA DRIS REITZ, XIANGXIN BI and NOBUYUKI KAMBE

Appeal No. 2001-1031
Application 09/136,483

ON BRIEF

Before GARRIS, LIEBERMAN, and POTEATE, Administrative Patent Judges.

POTEATE, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the examiner's refusal to allow claims 1-3 and 5-22, which are all of the claims pending in the application.

Claims 1, 17 and 19 are representative of the subject matter on appeal and are reproduced below:

1. A collection of particles comprising aluminum oxide, the collection of particles having an average diameter of primary particles from about 5 nm to about 500 nm and less than about one in 10^6 particles have a diameter greater than about three times the average diameter of the collection of particles.

17. A method for producing a collection of aluminum oxide particles having an average diameter from about 5 nm to about 500 nm, the method comprising:

flowing a molecular stream through a reaction chamber, the molecular stream comprising an aluminum precursor, an oxidizing agent, and an infrared absorber; and

pyrolyzing the flowing molecular stream in a reaction chamber, where the pyrolysis is driven by heat absorbed from a continuous wave laser beam.

19. A collection of particles comprising aluminum oxide, the collection of particles having an average diameter from about 5 nm to about 500 nm and a distribution of particle sizes such that at least about 95 percent of the particles have a diameter greater than about 40 percent of the average diameter and less than about 160 percent of the average diameter.

The references relied upon by the examiner are:

Shimo	5,064,517	Nov. 12, 1991
Rostoker et al. (Rostoker)	5,389,194	Feb. 14, 1995
Ueda et al. (Ueda)	5,697,992	Dec. 16, 1997

GROUNDS OF REJECTION[1]

1. Claims 1-3, 5-16 and 19-22 stand rejected under 35 U.S.C. § 103 as unpatentable over Rostoker alone or in view of Ueda. We affirm.

2. Claims 17 and 18 stand rejected under 35 U.S.C. § 103 as unpatentable over Shimo. We reverse.

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[1] The following grounds of rejection have been withdrawn:

1. The rejection of claims 1-3 and 5-16 under 35 U.S.C. § 112, second paragraph as indefinite;

2. The rejection of claims 1-3, 5-8 and 19-22 as unpatentable under 35 U.S.C. § 103 over any one of Sugoh, Ota, Arai, Moser and Helble;

3. The rejection of claims 1-3, 5-16, and 19-22 as unpatentable under 35 U.S.C. § 103 over Ueda and over Sakatani, Atsugi, Rosenblum, Zipperian, Rostoker '130, and Nevelle, taken alone or in view of Ueda;

4. The rejection of claims 17 and 18 as unpatentable under 35 U.S.C. § 103 over Sugoh, Ota, Arai, Moser, Helble, Sakatani, Ueda, Atsugi, Rosenblum, Zipperian, Rostoker 130, Rostoker 194 and Neville, and further in view of Shimo;

5. The provisional obviousness-type double patenting rejection of claims 1-3, 5-16 and 19-22 as unpatentable over claims 1-3, 5-9 and 11-16 of copending application no. 08/961,735. See Examiner's answer, paper no. 22, mailed November 16, 2000, pages 3-5, paragraph (10), Grounds of Rejection. This application has now issued as U.S. Patent No. 6,290,735 (September 18, 2001).

Appellants indicate that an issue on appeal is "[w]hether the claims are obvious over the claims of copending application 09/433,202?" Appeal brief, paper no. 19, received September 5, 2000. The claims have not, however, been finally rejected over the claims of copending application 09/433,202. See Final rejection, paper no. 14, mailed February 29, 2000, page 13 ("the examiner has not made an ODP rejection over the CIP application (09/433,202).")

BACKGROUND

The invention relates to collections of submicron aluminum oxide particles. Appeal brief, page 3, second paragraph. The particles are used, for example, for polishing hard materials such as semiconductors, ceramics, glass and metal. Specification, page 1, lines 15-17. The invention is further directed to a process for producing these particles using laser pyrolysis. Appeal brief, page 3, third paragraph.

According to appellants, the claimed collections of particles are extremely uniform in particle size. Appeal brief, page 3, second paragraph. Uniformity refers to the fact that the distribution of particle sizes around the average drops off very quickly and the particle size distribution does not have a tail, i.e., there are no particles above a certain cut off value. Id. Uniformity is important to ensure optimum polishing conditions. See specification, page 4, lines 10-18. In particular, particles which are larger than a certain cut off value tend to scratch the surface being polished, while particles which are significantly smaller than a desired cut off value are less effective in polishing and dilute the polishing composition with essentially useless material. See e.g., Rostoker, column 7, lines 55-61; Appeal brief, page 22, third paragraph.

DISCUSSION

1. Rejection of claims 1-3, 5-16 and 19-22 under 35 U.S.C. § 103 as unpatentable over Rostoker alone or in view of Ueda.[2]

The examiner found that:

> Rostoker et al. teach a polish comprising alumina particles having a size within the claimed range and therefore no distinction is seen to exist because the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have selected the overlapping portion of the range disclosed by the reference because overlapping ranges have been held to be a prima facie case of obviousness, *see In re Malagari*, 182 U.S.P.Q. 549.

Examiner's answer, page 4.

Appellants concede that Rostoker discloses aluminum oxide particles having an average particle size which overlaps the claimed average particle size. See appeal brief, page 14, second paragraph. However, appellants maintain that Rostoker does not disclose or suggest the particle size distribution of the claimed

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[2] For purposes of this appeal, appellants separately argue the patentability of three groups of claims: (1) claims 1-3 and 5-16, (2) claims 17 and 18, and (3) claims 19-22. In accordance with 37 CFR § 1.192(c), we shall decide the appeal as to this ground of rejection on the basis of claims 1 and 19. Ueda is relied on by the examiner as disclosing that it is known to use non-aqueous or aqueous mediums in making polishing compositions. See Examiner's answer, page 4, last sentence. Neither claim 1 nor claim 19 includes a limitation relating to the medium in which the claimed particles are dispersed (such limitation is present in claim 9 and the claims which depend therefrom). Accordingly, we need not address the Ueda patent.

collection of particles. Id. In this regard, appellants note that "[t]he particle size distribution is an independent property of the powders. Thus, two collections of powders can have the same average particle size, but a very different particle size distribution." Id. Appellants provide several reasons as to why Rostoker does not disclose or suggest the particle size distribution recited in claims 1 and 19. For the reasons discussed below, we do not find appellants' arguments persuasive.

Appellants argue that the only process disclosed by Rostoker for obtaining nanoparticles of aluminum oxide is a process described in U.S. Patent No. 5,128,081 to Siegel et al. (the Siegel patent). Appeal brief, page 22. According to appellants, the Siegel patent describes the use of a gas phase condensation method which leads to a tail at larger particle sizes such that the resultant particle size distribution is outside of appellants' claimed ranges. Id. As pointed out by the examiner, Rostoker does not state that the only method of making his particles is via the method disclosed in the Siegel patent. Examiner's answer, page 6, second paragraph. Rather, Rostoker merely references the Siegel patent as disclosing one known method for controllably producing ultrafine-grained or nanocrystalline materials. See Rostoker, column 6, lines 24-34.

In making a patentability determination, analysis must begin with the question, "*what* is the invention *claimed*?" since "[c]laim interpretation, . . . will normally control the remainder of the decisional process." Panduit Corp. v. Dennison Mfg. Co., 810 F.2d 1561, 1567-68, 1 USPQ2d 1593, 1597 (Fed. Cir.) cert. denied, 481 U.S. 1052 (1987). Claims 1 and 19 both claim "A collection of particles *comprising* . . . ." Use of the word "comprising" does not preclude the presence of additional components or particles. See In re Baxter, 656 F.2d 679, 686, 210 USPQ 795, 802 (CCPA 1981). Thus, as pointed out by the examiner, the claims, as drafted, do not preclude the presence of a tail. See Examiner's answer, page 7. Further, claims 1 and 19 are not in any way limited to a collection of particles produced by Appellants' laser pyrolysis method. See In re Morris, 127 F.3d 1048, 1054, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997). (In determining the patentability of claims, the PTO gives claim language its "broadest reasonable interpretation" consistent with the specification and claims).

In any event, we are further in agreement with the examiner that Rostoker discloses a collection of particles having both the sizes *and* distribution within appellants' claimed ranges, i.e., Rostoker appears to disclose a collection of particles which do

not include a tail. See Examiner's answer, page 6, first paragraph. In support of his position, the examiner references the teachings in column 7, the examples, and claim 10 of Rostoker. Id. Appellants argue that they are unable to understand Rostoker's teachings relating to particle distribution and, therefore, are unable to make a comparison with their claimed distributions. See Reply brief, page 8, second paragraph. We find the examiner's reference to specific teachings in Rostoker sufficient to establish a prima facie case of obviousness.[3]

With respect to the existence of a tail in Rostoker's collection of particles, we note that Rostoker discloses a quality factor "Q" which is inversely related to distribution of particle sizes. See Rostoker, column 7, lines 6-18. According to Rostoker, maintaining a high "Q", i.e., a high concentration of particles around the average particle size, ensures superior polishing because it minimizes particles which are significantly

[3]For appellants' reference, sample calculations showing the overlap in Rostoker's particle distribution with the claimed particle distribution is provided in the appendix attached hereto. The examiner and appellants may wish to consider whether Rostoker anticipates any of the claims as presently drafted in the event that appellants elect to continue prosecution of this application.

larger or smaller than the average. See column 7, lines 19-26 and lines 55-61. These teachings suggest that Rostoker's collection of particles have an extremely uniform particle size and do not include a tail. Accordingly, we find that the examiner has established a prima facie case of obviousness with respect to claims 1 and 19.

In support of their arguments that the claimed invention is nonobvious, appellants rely on the Kambe declaration. See Reply brief, page 8, last paragraph. We agree with the examiner that this declaration is unpersuasive since it fails to address the examiner's prima facie showing of obviousness of the claimed collections of particles. See Examiner's answer, page 7. "[T]he Kambe declaration was submitted by Applicants as support that other approaches for the formation of Applicants' claimed invention are not available." Reply brief, page 8, last paragraph. As discussed above, Rostoker teaches a collection of particles having sizes and distributions within the claimed ranges (see Examiner's answer, pages 7-8) and the claims as drafted are not limited to particles produced by a particular method. Further, as alluded to by the examiner (see Examiner's answer, page 8), Mr. Kambe's assertions are unsupported by any type of evidentiary showing.

Accordingly, the rejection is affirmed.

2. Rejection of claims 17 and 18 under 35 U.S.C. § 103 as unpatentable over Shimo

The examiner found that Shimo "teaches a method of making aluminum oxide which comprises all of the claimed steps and therefore no significant difference is seen to exist [between Shimo and the claimed invention] in the absence of any evidence showing the contrary." Examiner's answer, page 5, third paragraph. Appellants note that Shimo teaches a process wherein gaseous reactants are placed within a reaction chamber and therefore, "does not teach or suggest reacting a *flowing* reactant stream." Appeal brief, page 24, second paragraph. The examiner maintains that because Shimo's vapor has flowing capabilities, i.e., is not 100% still, it reads on the claimed method. Examiner's answer, page 7, second paragraph.

In general, claim terms in a patent application are given their ordinary meaning as used in the field of the invention unless the specification indicates that a word has special meaning. In re Thrift, 298 F.3d 1357, 1364, 63 USPQ2d 2002, 2006 (Fed. Cir. 2002). Appellants urge that the term "flow" means a net movement of fluid, not the capability to flow or the random

motions of individual gas particles. See Reply brief, page 12, third and fourth paragraphs (referencing the definition of flow from Webster's Tenth Collegiate Dictionary, attached to the reply brief). We also note that claim 17 utilizes the term "flowing" in conjunction with movement of a molecular *stream through* a reaction chamber. A "stream" is defined as a continuous procession moving in one direction. See, generally, Webster's Third New International Dictionary 2258 ([1]stream 2c)(1971). Accordingly, we agree with appellants that the language of claim 17 clearly defines over Shimo's method wherein the vapor reactants are held in a glass vessel during irradiation and are not in the form of a stream flowing through a reaction chamber.

The rejection is reversed.[4]

In summary, we affirm the rejection of claims 1-3, 5-16 and 19-22 under 35 U.S.C. § 103 as unpatentable over Rostoker alone or in view of Ueda and reverse the rejection of claims 17 and 18 under 35 U.S.C. § 103 as unpatentable over Shimo.

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[4] We base our reversal of this ground of rejection solely on the facts and reasons relied on by the examiner in support of the rejection. We note, in particular, that the examiner does not assert that it would have been obvious to have replaced Shimo's batch process wherein reactants are held in a chamber during irradiation with a continuous process wherein reactants flow through a reaction chamber during irradiation.

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

BRADLEY R. GARRIS)
Administrative Patent Judge)
)
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) BOARD OF PATENT
PAUL LIEBERMAN)
Administrative Patent Judge) APPEALS AND
)
) INTERFERENCES
)
LINDA R. POTEATE)
Administrative Patent Judge)

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APPENDIX

Rostoker teaches that:

> the alpha aluminum oxide particles used for polishing exhibit the following characteristics. Preferably, the particle size is "X" nm, and the distribution of particle sizes is controlled to within "Y" nm, and the particles used for polishing are "Z" percent (%) in the alpha phase, where: "X" is 10-100 nm; such as 10, 20, 30, 40 and 50 nm, and is preferably no greater than 50 nm; and "Y" is approximately "P" percent of "X", where "P" is 10%, 20%, 30%. 40% or 50%, and is preferably no greater than 50% to ensure a narrow (Gaussian) distribution of particle sizes about "X"; "Z" is at least 50%, including at least 60%, 70%, 80% and 90%, and as high as 100%.

Rostoker, column 7, lines 4-17.

EXAMPLE 1 (Rostoker): Average particle size X = 10 nm

1. Y = 10% of 10 nm (P x X) = 1 nm

Particle size distribution (X ± Y) = 9-11 nm (10 ± 1nm)

2. Y = 50% of 10 nm = 5 nm

Particle size distribution = 5-15 nm (10 ± 5nm)

COMPARISON EXAMPLE 1: Average particle size = 10 nm

Claim 1: Particle size distribution = 0-30 nm (10 x 3)

Claim 19 : Particle size distribution = 4-16 nm (10 x .4; 10 x 1.6)

EXAMPLE 2: Average particle size = 100 nm

3. Y = 10% of 100 nm = 10 nm

Particle size distribution = 90-110 nm (100 ± 10)

4. Y = 50% of 100 nm = 50 nm

Particle size distribution = 50-150nm (100 ± 50)

COMPARISON EXAMPLE 2: Average particle size = 100 nm

Claim 1: Particle size distribution = 0-300 nm (100 x 3)

Claim 19: Particle size distribution = 40-160 nm (100 x .4; 100 x 1.6)